

IRD NEWS

PRODUCT APPLICATION NEWS FROM INTERNATIONAL RESEARCH AND DEVELOPMENT CORPORATION

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BALANCING OVERHUNG ROTORS

by R. E. Ellis, Manager, IRD Consulting Service

A new approach to balancing overhung rotors provides successful results in a few runs.

The normal method for in-place balancing of overhung rotors, where the correction planes are outboard of the bearings, is often a frustrating one. The usual technique is to reduce vibration readings at the inboard bearing (Bearing #1 in the illustration) with corrections in the inboard plane (Plane B). Then, the outboard plane (Plane A) is balanced using vibration readings from the outboard bearing (Bearing #2). More often than not many time consuming balancing runs are required.

The following method has a proven record of success in balancing overhung rotors in the fewest numbers of runs:

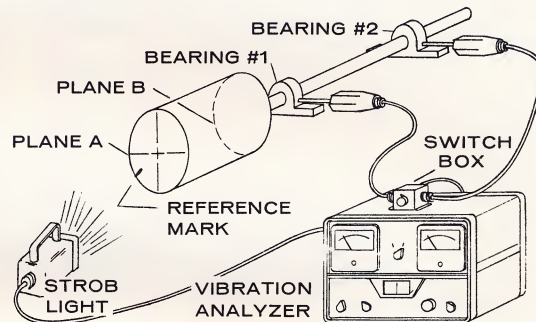
Step #1 Arrange the balancing equipment as shown in the illustration. Best results are obtained by mounting a pickup at each bearing housing using Vise Grips (Part #1821) or Magnetic Holder (Part #4332).

Step #2 From the vibration pickup on Bearing #1 observe the position of the reference mark (phase) and the vibration displacement.

Step #3 Turn machine off. Add a trial weight in Plane B. Then turn on and observe the new phase and vibration reading.

Step #4 With a vector diagram on Polar Graph paper (IRD #445) determine the proper amount and location for the weight in Plane B. Make the required correction and continue to reduce the vibration at Bearing #1 until an acceptable balance is achieved for Plane B.

Step #5 From the vibration pickup on Bearing #2 observe the vibration displacement and phase. If this displacement reading is acceptable no more balancing is required. If not, record reading



as the original run for Bearing #2 and proceed to the next step.

Step #6 Turn machine off. Select a pair of trial weights of equal size and add one in Plane A and one in Plane B, 180° apart. Observe the new vibration displacement and phase readings at Bearing #2.

Step #7 Using the readings taken during Step #5 & #6, construct another vector diagram as though the pair of weights were a single one. Increase or decrease *both* weights by the same amount and change their angular position by the same angle always keeping the weights 180° apart. Balance to an acceptable reading on Bearing #2.

Step #8 If the vibration displacement at Bearing #1 has increased to an unacceptable level plot the vector for the new reading with the original reading for Plane B from Step #2. Only a slight adjustment to the amount and/or location of the Step #4 weight should be required.

For reprints of this report (IRD #744A) write IRD, Worthington, Ohio.

TRAINING NEWS

NATIONAL AUDIO-VISUAL TRAINING SCHOOL

For date and location of the next school to be held in your area, contact your IRD Representative or District Office. This basic training is the prerequisite for advanced training, offered at no charge, at IRD's plant in Worthington, Ohio.

ADVANCED TRAINING SCHEDULE

Engineered Maintenance

April 13 & 14 June 15 & 16
May 11 & 12 July 13 & 14

Shop & Production Balancing

April 20 & 21 June 22 & 23
May 18 & 19 July 20 & 21

For additional information write for Training Brochure (IRD #752).

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from IRD

TWO NEW TOOLS FOR MACHINERY MAINTENANCE

A NEW Portable Vibration Analyzer/Dynamic Balancer . . .

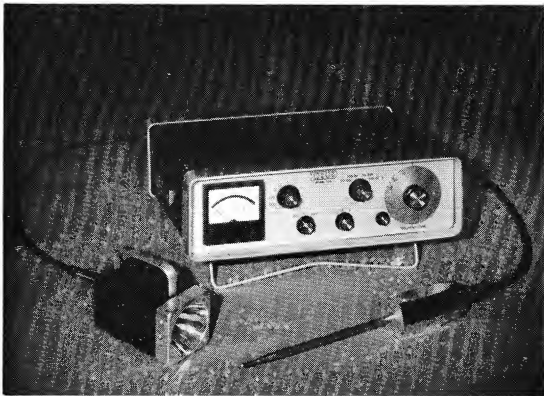
From the penthouse of a building to a giant powerhouse, from ships at sea to the top of a refinery tower, excessive vibration means the same thing . . . mechanical trouble is present.

To meet this demand for an instrument to go wherever vibration problems exist, IRD has developed the Model 330 Vibration Analyzer/Dynamic Balancer. This new instrument, weighing only 17½ pounds, uses advanced solid state circuitry and batteries to provide a new freedom of portability and rugged simplicity. Its broad range and sensitivity provide the utility for applications plant-wide, in the laboratory and in the field.

In addition to operating on 110 volt, 50/60/400 cycle AC power, Model 330 operates on replaceable (over 200 hours life) mercury batteries for the analyzer portion and a rechargeable battery pack for the stroboscopic light. The 330 is completely equipped — for vibration measurement, vibration analysis and in-place dynamic balancing wherever machinery maintenance and balancing problems are encountered.

With a tunable filter frequency range from 50 to 500,000 CPM vibrations are separated from others just as a radio is tuned to various stations. This permits pinpointing troubles such as unbalance, misalignment, bad bearings, faulty gears, drive belts, and looseness.

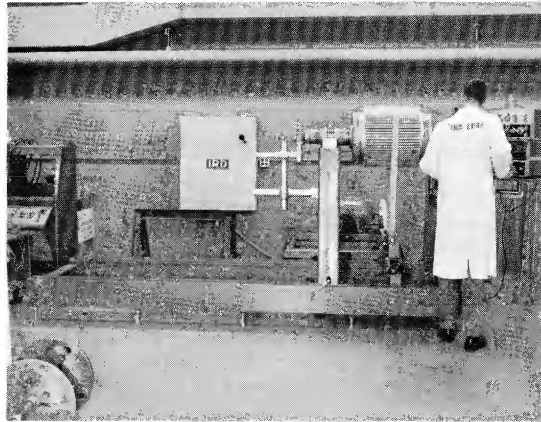
The Model 330 and accessories store in a convenient carrying case — fits neatly under an airline seat.



IRD's new portable Vibration Analyzer/Dynamic Balancer, Model 330, weighs only 17½ pounds — operates on either batteries or 110 volt A.C.

For descriptive specifications on this new Model 330 ask for Brochure #836.

A NEW 10,000 Pound Capacity Balancing Machine . . .



IRD's new Model 120 Balancing Machine with portable IRD instrumentation provides a complete system for dynamic balancing parts up to 10,000 pounds, single plane or two plane. Model 120 features fast set-up in minutes for a wide variety of workpieces. The portable instruments can be used plant-wide or in the field — for machinery analysis and in-place dynamic balancing.

Unique **adjustable roller bearing supports** end the search for workpiece bearings for every new job. Free to pivot in two directions, the bearings virtually eliminate possible journal damage. Interchangeable V-blocks are provided for workpieces with their own bearings.

The **adjustable speed/continuous belt drive** eliminates costly delay for set-up and special tooling. A flat belt drives the workpiece even over irregular surfaces — to balance at exact speeds specified. Dynamic braking and an automatic torque limiter provide fast, safe operation.

Fast, accurate results are assured by using any portable IRD Vibration Analyzer as the balancing instrument. The adjustability and broad capacity of the 120 Balancing Machine make it ideal for handling fans, armatures, turbines, rolls, gears, pump impellers — practically anything that rotates — one at a time or in production. A portable Balancing Computer is available to provide unbalance readings in actual terms of correction in one start-stop operation.

A balancing machine considered as part of a plant-wide application of vibration — the key to machinery condition — supports a program of positive engineered maintenance control.

For additional information write for Brochure #852.

VIBRATION--The Positive :

"HOT ALIGNMENT" USING VIBRATION

Mobil Oil's Buffalo Refinery avoids costly downtime by using simple vibration measurement to align machines.

Melvin Andrews, Maintenance Supt., uses the six pound, battery-operated IRD Model 320 Vibration Selector to keep a close check on his critical refinery machines. The Vibration Selector not only measures overall machine vibration but also permits the operator to pinpoint the cause. A tunable filter selects individual vibrations much as a radio "tunes" to a station. The frequency of the "tuned" vibration, normally equal to the speed of the defective part, enables the operator to tell if the trouble is unbalance, misalignment, looseness, or a bad bearing.

New machines installed at this Buffalo Refinery receive a thorough vibration check. With the vibration pickup placed on each bearing housing, in horizontal, vertical and axial directions, the filter is tuned to the frequency of each vibration present. Results compared with established standards provide a fast, convenient method of assuring a new machine is in satisfactory working order.

These initial vibration readings are logged for comparison with future periodic checks. When an increase is noted a thorough vibration analysis reveals the specific problem. In this way troubles are spotted in their early stages for scheduled correction.

When misalignment is the trouble, Melvin Andrews with his IRD Model 320 Vibration Selector and two mechanics, align machines while they run. By observing the vibration while adjusting the



Maintenance Supt., Melvin Andrews, uses his IRD Model 320 Vibration Selector for a vibration check of running alignment on a 3000 h.p. 8470 RPM flare gas compressor at Mobil Oil's Buffalo Refinery.

set bolts, machines are aligned to an acceptable level. It's that simple. Thousands of dollars are saved in reduced downtime using this "hot alignment" practice.

Needless to say, with potential savings like this, it pays Mobil Oil to make periodic vibration checks on all rotating machinery. In addition, vibration checks are made after piping modifications to see that they have not caused machine misalignment.

Mel Andrews uses temperature and other measurements in his fight against downtime but he relies mostly on vibration to tell when trouble is present. He contends you have to own and use the Model 320 to appreciate all it can do.

COME SEE THE LATEST FROM IRD

Plant Engrg & Maint. Show

Public Auditorium, Cleveland

March 21-24 Booth 849

1966 ASTME Exposition

Cobo Hall, Detroit

April 18-22 Booth 1636

Canadian Plant Engrg & Maint Show

Show Mart. Montreal, Que.

May 17-20 Booth 143-144

New Literature Available

IRD Balancing Machines

A new 8-page brochure describes how you can prorate balancing machine cost to all departments. IRD Balancing Machines feature fast set-up and accurate results for parts from 4 ozs. to 50,000 pounds. A balancing machine requirements form for listing your workpiece specifications is included so IRD can recommend a system best suited for overall plant and field applications. Write for IRD Balancing Machine Brochure (IRD #525).

Answers from the Experts

Question: Where can I get that new material for making permanent weight corrections on electric motor rotors?

Answer: The material referred to is a leaded epoxy. When first mixed it has the consistency of putty and cures overnight at room temperature. Curing can be reduced to about 10-30 minutes with a heat lamp. Part surfaces must be clean and oil free. Additional information is available from these two sources:

Barco Sales Co. — Mr. Malcom M. Bard

Astro Chemical Co.

2063 Baker Avenue

Schenectady 9, N. Y.

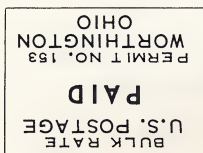
Epoxilite Corp.

428 North Tyler Ave.

P. O. Box 3397

South El Monte, Calif.

Key to Machinery Condition



IRI
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 RESEARCH AND
 DEVELOPMENT CORP.
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 6150 HUNTLEY ROAD
 WORTHINGTON, OHIO

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 Penn Hills, Verona, Penn.

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 Manoa Shopping Center
 Havertown, Pa.
 Phone 215/JA 8-5990

BUFFALO, N. Y.
 500 Mill St.
 Williamsville, N. Y.
 Phone 716/NF2-6699

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 Phone 203/255-0893

DALLAS, TEX.
 4058 Davila Dr.
 Phone 214/352-8312

SAN FRANCISCO, CALIF.
 376 College Ave.
 Palo Alto, Calif.
 Phone 415/321-3727

IRI AGENTS

Check your telephone directory for the nearest office.

NEW ENGLAND, NEW YORK, NEW JERSEY
 TEK Bearing Co., Inc.

**W. NEW YORK, MD., DELA., PA., KY.,
 W. VA., OHIO, IND., S. ILL. & E. MO.**
 Bearings Inc. or Bruening Bearings, Inc.

CHICAGO & N. ILL.
 Berry Bearing Co.

SOUTHEAST TEXAS
 Ashley-Hickham Maintenance
 & Engineering Co., Inc.

S. ATLANTIC & SOUTHEAST
 Dixie Bearings, Inc.

MICHIGAN
 Michigan Bearing Co.

MINNESOTA & N&S DAKOTA
 Minnesota Bearing Co.

WISCONSIN
 Wisconsin Bearing Co.

CALIFORNIA
 Pacific Bearing Co.

CANADA
 Robertson-Irwin Ltd.

c/o K. M. Jarrett
 90 Selgrove Crescent
 Oakville, Ontario
 Phone 416/827-0612

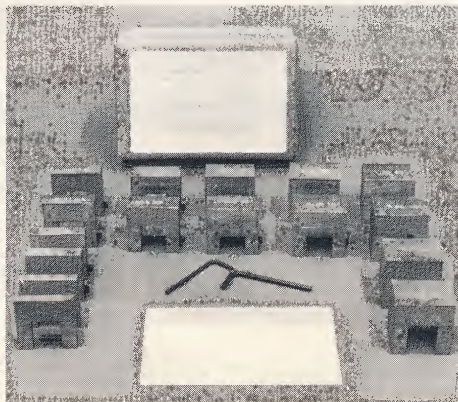
**NORTH & SOUTHWEST TEXAS,
 OKLAHOMA, NEW MEXICO**
 Butler & Land, Inc.

NORTHWEST
 Scientific Supplies Co.

Helpful FACTS about IRI Products IRI Balance Weights

IRI Part No. 4753

Speed your fan and blower balancing with a set of IRI Balance Weights. Set includes two (2) each of the following: 1.75 oz; 2.75 oz; 3.75 oz; 4.5 oz; 5.5 oz; 6.25 oz; 7.25 oz; and 8.00 oz — a total of 16 weights with set screws for attachment and two (2) Allen wrenches. Weights are made of cold rolled steel, S.A.E. 1018. Shipping weight is 6 pounds. Complete set (Part #4753). **Price — \$25.60 F.O.B. Worthington, Ohio.**



Pass the IRI News on to your fellow workers. If you want a name added, corrected or removed from our mailing list, send name and mailing address to IRI, attn: IRI News Editor.